SHORT COMMUNICATION

# In-office technique to fabricate triple tray

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## ABSTRACT

Dual arch impressions have been in use for many years. Five in-office techniques for fabrication of the tray have been suggested, in case the manufactured (stock) tray is not available to the clinician. The design consists of two parts of the tray (the plastic frame and lattice). Five types of materials for the lattice have been described. The indications, advantages, and disadvantages of the techniques together with an appraisal of the five different lattice materials have been described. Overall the techniques are simple and require materials that are easily available. It does not take much time and can be used to attain efficient results in case the stock tray is not available in the operatory.

**Key words:** Dual impression, in-office, triple tray

Dual arch impressions have been in use since almost 25 years.[1] The technique retains its popularity as it saves time, reduces patient discomfort, and conserves the utilization of impression material. Other major advantages of the technique include reduced chance of error due to flexion of mandible during wide opening; articulation of casts without interocclusal records, and discrepancies arising when opposing casts are made with different impression materials.[1] Dual arch impressions have been shown to be more accurate than or as accurate as complete arch impressions when prepared properly.[2-5]

The tray used to make these impressions is different from the full arch trays and is called as a triple tray. There are a number of commercially available brands which provide triple trays. However, in some situations when a clinician does not have these commercial brands, simple ways to fabricate these trays in-office can be implemented. The authors provide five different options to choose from when fabricating the tray in-office.

## DESIGN OF THE IN-OFFICE TRIPLE TRAY

There are two parts of the tray. One part is a plastic frame, the design of which is common for all the tray types. The other is a lattice (of different materials) which helps to support and carry the impression material as well as obtain a bite registration.

### Plastic frame fabrication technique

The stiff plastic nose clip of a surgical mask (Conmed Devices Pvt. Ltd., New Delhi, India) is removed and bent into two separate U-shaped frames using hot water and a plier [Figure 1].

### Selection of material for lattice

Various materials can be selected to form the lattice. These materials are interposed between the two previously formed U-shaped frame and luted with cyanoacrylate.

The materials are:

- Semi-permeable paper barrier [Figure 2a]: These can be obtained from commercially available tea/coffee bags. They are made from creped paper and reinforced with abacá plant fibers and synthetic fibers. They are very porous, thin and have high wet strength. The high wet strength enables them to withstand bite force during impression making in the oral cavity. However, the disadvantage is that if too much flexure force is applied on closure, they can tear mainly due to their flimsy nature. Furthermore, if a repeat impression of the patient has to be made by removing the previous impression,

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then even though removal is easy due to (less mechanical interlocking of impression material); there is a chance of damaging the lattice. They are also semipermeable and have a tendency to absorb moisture from oral cavity or the impression material, thus predisposing the final impression to inaccuracies

- Nylon impregnated cloth as seen in disposable drapes/masks [Figure 2b]: Retention of impression material to the lattice is good. There is however scope for water absorption thus predisposing the final impression to inaccuracies. If a repeat impression has to be made in case an error occurs, then removal of the previous impression can damage the lattice
- Medical gauze [Figure 2c]: Medical cotton gauze can be used. The space between the warp and weft threads helps to interlock the impression material. However, the presence of cotton predisposes the lattice to increased water absorption. The interlocking of impression material is also intense, and if a repeat impression has to be made, removal of previous impression material is incomplete from the lattice. Any attempt to remove the impression can damage the lattice. Hence, the tray is usable only once for each patient. However, intense interlocking of impression material can preclude the use of an adhesive
- Clear plastic sheet [Figure 2d]: Plastic sheet used as spacer with putty viscosity of PVS (Reprosil™, Dentsply-Caulk, Milford, DE, USA) or food grade plastic (bio plastic made of polylactide as seen in plastic tea bags), can also be used. The advantage is that they will be easy to adapt and will again not absorb any moisture. The drawback is that the sheet can tear or fall apart if too much force is applied on closure, and since it is clear, the tear can be missed. If the impression has to be repeated for the same patient then on removal of the previous impression the plastic sheet can distort. Hence, it can be used only once for each patient
- Nylon sieve [Figure 2e]: Main advantage is that the nylon sieve lattice creates mechanical interlocking of impression material thus reducing the need of adhesives. Use of adhesives can cause discomfort due to foul smell in some patients. Since the entire tray is in nylon, there is no scope for moisture absorption. The interlocking is however not as intense as seen with medical gauze, hence if a repeat has to be made the lattice is not damaged, and the tray can be reused.

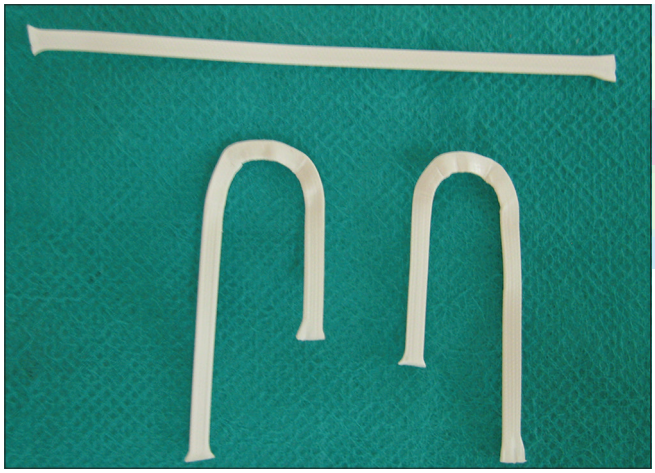

**Figure 1:** Nose clip used to form nylon clips

## DISCUSSION

The technique of fabrication of the trays is simple, and all the materials are easily available. The time taken to fabricate each tray is 5-10 min. In case a situation arises in clinical practice when the commercially available trays are not handy, the technique to fabricate in-office trays can be implemented [Figure 3].

## ADVANTAGES

The size of the tray can be customized, if required, thus controlling the amount of impression material. This limits the amount of shrinkage associated with increased material and also conserves the material.

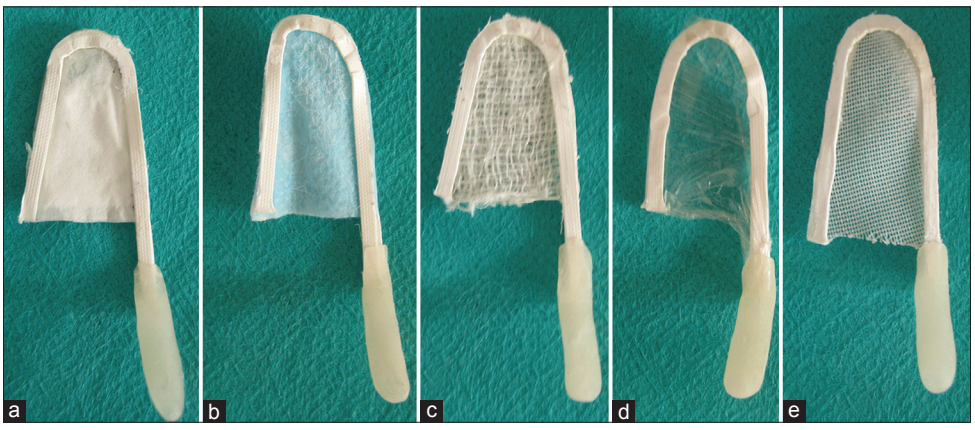


**Figure 2:** (a) Tray made out of semi permeable paper barrier. (b) Tray made out of nylon impregnated cloth as seen in autoclavable drapes/masks. (c) Tray made out of medical gauze. (d) Tray made out of clear plastic sheet. (e) Tray made out of nylon sieve

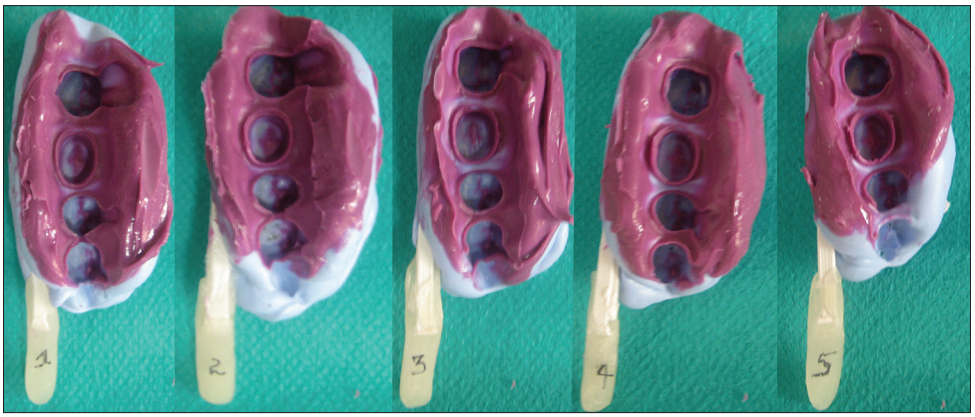


**Figure 3:** Final impression in the five types of trays

Tray size according to arch is also more comfortable for the patient, and there is less chance of gagging.

Accurate bite registration can be recorded with all types of lattice due to thin occlusal wafer associated with all the five materials used. The supporting lattice has been seen to be imperceptible to the patients, thus avoiding alterations in occlusion during impression making. The bite accuracy (and the final occlusion of clinical restorations) was seen to be enhanced in a lattice made from cotton gauze and sieve as these lattices resist tearing, and the loose webbing maximizes intercuspation of the teeth.

It has been reported that accuracy of impressions is compromised (discrepancies of 180–210 microns) when plastic dual-arch trays flex due to the high sidewalls of the plastic trays hitting the palatal tissues, maxillary tuberosities, or tori present in the patient's oral cavity.[6] If the tray contacts these tissues, its sides may be forced apart when the patient occludes. When the impression is removed from the patient's mouth, the rebound of the tray's sidewalls can result in distortion of the impression.[6] The low sidewalls cannot cause distortion due to axial roll or outward flex. Hence, the trays have been designed in this technique such that they do not touch the buccal or lingual surfaces of the alveolar ridges. Furthermore, the stiff nylon frame stays rigid otherwise; it becomes flexible only when immersed in hot water.

During the designing of plastic frame, it was ensured that the bar connecting the buccal and lingual walls of the tray were distal to the most posterior tooth and did not impinge on the tuberosity or the retromolar pad. Prior to making the impression, the occlusal contacts on the opposite side of the patient's mouth was verified using mylar ribbon and it was confirmed that there is no impingement of the tray on the patient's soft tissues.[7] Hence in our case, very thin yet stiff bar was fabricated in continuity with labial and lingual sides of the tray.

## INDICATIONS

The technique should be limited to single units or multiple units in select cases (the units must be adjacent or short-span fixed partial dentures); can be used only if distal most tooth support is present and vertical dimension of occlusion can be maintained by this tooth (vertical) stops - preferably the second molar must be present; an adequate number of teeth must be present in both arches to provide stable occlusal and proximal contacts (the ideal being teeth present on either side of the tooth or teeth to be restored); when the desired position for the restored teeth is in Maximum Intercuspal Position (other positions, such as centric occlusion, cannot be recorded using a 3-way tray impression); limited to patients with canine disclusion (the geometric relation of cusp to condyles as seen in eccentric movements is not maintained when casts are mounted using the technique). An additional indication of the technique is in patients prone to gagging (less utilization of material can be beneficial by a reduction in bulk of the material and decreased sensation of nausea).[2]

## LIMITATION

The technique is not without pitfalls. Though the chair side time and impression material consumption is reduced by fabricating these trays; additional time is spent to fabricate these trays. In addition, special materials as described must be availed to fabricate these trays. None of the trays fabricated by the technique have a metal component. While some studies favor the presence of metal frames, others suggest that dual-arch impression trays especially when flexible are an acceptable alternative to conventional impression taking procedures.[8,9] However, it is suggested to rely upon dense impression material to provide support during the impression procedure and while pouring the stone models.[2]

The technique could not provide a clear plastic body/framework. However, if that is incorporated, then

clear plastic body lets one view the correct position of the impression tray on the preparation.

The validation of the technique, however, requires further study to compare the in-office trays with the commercially available and acceptable trays.

Additional disadvantages associated with stock triple trays are also encountered. These include: Technique sensitivity of the procedure; the lattice tray material between the teeth can cause distortion in the occlusal morphology of the unprepared teeth, and may cause a slight shift in the occlusion when biting into the impression material; increased dependency on patient to close in correct MIP;[2,10,11] determining whether MIP has been achieved is challenging, especially if the occlusion is not ideal (as seen in cases where there is lack of posterior occlusion on other side of the arch),[2,7] as the articulation used does not represent the normal distance from the condyles to the restorations fabricated, lateral or protrusive movements made will not replicate patients movements and will require chair side adjustments as compared to full-arch casts mounted on a semi-adjustable articulator; since the teeth on the contralateral side are not recorded, the tooth morphology produced in the restoration will not match to these teeth; fabrication of a surveyed crown (if required for RDP) requires the evaluation of the contour of teeth on the contralateral side of the arch which cannot be captured by these trays;[2,10] restorations for patients with complex occlusal schemes, such as cross-arch balancing contacts and group function, will require a significant amount of adjustment if they are fabricated using these trays; the issue related to the strength of the impression material and its ability to support the die stone when the casts are poured can be bothersome as the weight of the die stone may distort the impression and result in an inaccurate die.[2]

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